Remarks

Claims 58-80 are pending in the subject application. Applicants acknowledge that claims 65-79 have been withdrawn from further consideration as being drawn to a non-elected invention. By this Amendment, Applicants have amended claims 58, 63, 64 and 80 and added new claims 81-88. Support for the amendments and new claims can be found throughout the subject specification and in the claims as originally filed and previously presented (see, for example, original claim 4, previously presented and currently pending claim 58 and pages 3, 10 and 13). Entry and consideration of the amendments presented herein is respectfully requested. Accordingly, claims 58-88 are currently before the Examiner with claims 65-79 standing withdrawn from consideration. Favorable consideration of the pending claims is respectfully requested.

The Office Action objects to Figures 1, 7, 13, 19, 31, and 42 because they do not have titles on the abscissa. The Office Action indicates that it is difficult to compare the relative strength of the responses without a label on the abscissa. The abscissa of the figures has been amended to provide the label requested in the Office Action. Figures 57 and 65-68 are objected to because it is difficult to differentiate the information provided in the legends. By this Amendment, Figures 57 and 65-68 have been amended to more clearly identify the isotypes. No new matter has been added by these amendments. Reconsideration and withdrawal of the objection is respectfully requested.

The disclosure is objected to because of informalities. Applicants note that the Office Action suggests revising the as-filed specification to conform with the Patent Office's preferred layout for a specification. Applicants respectfully submit that there is no statutory or rule-based authority for requiring submission of a specification in the format indicated to be the "preferred layout" by the Patent Office in the M.P.E.P. at section 601(I) and elect to retain the specification in its present form at this time; however, Applicants may submit a revised specification, including the headings suggested in the Office Action, at a later time.

The abstract is objected to because of the recitation "relates to a vaccination." The abstract has been amended. No new matter is included in the Abstract. Accordingly, reconsideration and withdrawal of the objection is respectfully requested.

Claims 58-64 and 80 are rejected under 35 U.S.C. § 112, second paragraph, as indefinite in the recitation of the phrases "a viral capsid substantially incapable of replication in a patient" and

"against which it is desired to obtain an immune response". In view of the amendments presented in this response, it is respectfully submitted that this issue is now moot.

Claim 64 is rejected in its recitation as examples of "capsids" MVA and "a poxvirus", "MVA or NYVAC", "an Orthopox virus" and "a fowlpox virus". Applicants note the comments set forth in the Office Action; however, it is respectfully submitted that the rationale articulated in establishing the rejection of the claimed term is inconsistent with the commonly understood definition of "capsid". As noted in the attached print-out, a capsid is:

> The shell of protein that protects the nucleic acid of a virus; it is composed of individual morphological units called capsomers. For icosahedral viruses, there are two kinds of capsomers called pentamers, which occupy the 12 corner positions of the icosahedral shell, and hexamers, which occupy the face and edges. The number of hexamers varies between different viruses. The capsomers of helical viruses are composed of a single polypeptide and are also called protomers. All viruses of animals, except for poxviruses which have a complex structure, are minimally composed of a nucleocapsid which is the capsid surrounding the nucleic acid. In addition some viruses have an envelope surrounding the nucleocapsid.

Thus, it is clear that the term "capsid" would be understood by those skilled and reconsideration and withdrawal of the rejection, as relates to the term "capsid" is respectfully requested.

Claim 63 is rejected for insufficient antecedent basis for the limitation "vector." Applicants have amended the dependency of claim 63 in a fashion that renders this issue moot. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. § 112, second paragraph, is respectfully requested.

Claims 58-64 and 80 are rejected under 35 U.S.C. § 102(b) as anticipated by Feng *et al.* (2001). The Office Action indicates that Feng *et al.* teach the induction of simultaneously a $CD8^+$ T-cell response and an antibody response to *M. tuberculosis*-encoded early secreted protein MPT64 under various immunization protocols. The Office Action also states that Feng *et al.* teach that $CD8^+$ T-cell activation is associated with protection and that the antigens used in their studies activated such T-cell association. Applicants respectfully assert that the Feng *et al.* reference does not anticipate the claimed invention. For example, it is respectfully submitted that Feng *et al.* do not teach a composition comprising a viral capsid incapable of replication and at least one protein antigen against which it is desired to obtain an immune response and that is co-administered with said capsid, said composition inducing both an antibody response against the co-administered protein antigen and a protective T-cell

response against said co-administered protein antigen. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 102(b) is respectfully requested.

Claims 58-64 and 80 are rejected under 35 U.S.C. § 103(a) as obvious over Huygen *et al.* (1996) in view of Leong *et al.* (1995) and Sutter *et al.* (1992). The Office Action states that Huygen *et al.* disclose a tuberculosis antigen, Ag85, in a DNA plasmid vector that induces THI-type T cell response and interferon gamma production after being injected intraperitonially into mice three times. Leong *et al.* is cited as disclosing a method of generating enhanced immune responses against influenza by consecutive immunization with priming plasmid DNA vectors, intramuscularly, and boosting recombinant fowl poxvirus vectors, intranasally. The Office Action asserts that Sutter *et al.* suggest using the non-replicating MVA to express recombinant genes. Applicants respectfully assert that the claimed invention is not obvious over the cited references.

As the Patent Office is aware, all the claim limitations must be taught or suggested by the prior art in order to establish the *prima facie* obviousness of a claimed invention (*CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) citing *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974)). In this case, it is respectfully submitted that the rejection of record fails to teach or suggest all of the claim limitations. For example, Huygen *et al.* (1996) fail to teach a composition comprising a viral capsid incapable of replication and at least one protein antigen against which it is desired to obtain an immune response that is co-administered with said capsid, said composition inducing both an antibody response against the co-administered antigen and a protective T-cell response against said co-administered antigen. Rather, Huygen *et al.* teach a DNA vaccine that encodes an antigen against which an immune response is desired and the cited reference fails to teach a protein antigen against which an immune response is desired that is co-administered with a viral capsid. Applicants further submit that the cited teachings of Leong *et al.* (1995) and Sutter *et al.* (1992) fail to remedy this defect in the teachings of Huygen *et al.* Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has not been established by the cited combination of references and reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

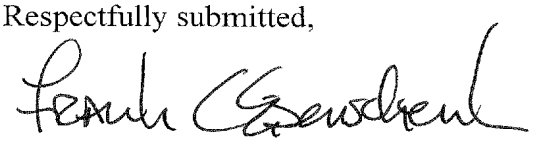
It should be understood that the amendments presented herein have been made solely to expedite prosecution of the subject application to completion and should not be construed as an indication of Applicants' agreement with or acquiescence in the Examiner's position. Applicants expressly reserve the right to pursue the invention(s) disclosed in the subject application, including any subject matter canceled or not pursued during prosecution of the subject application, in a related application.

In view of the foregoing remarks and amendments to the claims, Applicants believe that the currently pending claims are in condition for allowance, and such action is respectfully requested.

The Commissioner is hereby authorized to charge any fees under 37 CFR §§1.16 or 1.17 as required by this paper to Deposit Account No. 19-0065.

Applicants invite the Examiner to call the undersigned if clarification is needed on any of this response, or if the Examiner believes a telephonic interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,



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FCE/sl
Attachments: Replacement Figures
Definition of "capsid"

Dictionary:

capsid

(kăp'sĭd)
n.

The protein shell that surrounds a virus particle.

[From Latin capsa, box.]

capsid Find

Medical Dictionary: cap·sid
(kăp'sĭd)
n.

The protein shell that surrounds a virus particle.

Veterinary Dictionary: capsid

The shell of protein that protects the nucleic acid of a virus; it is composed of individual morphological units called capsomers. For icosahedral viruses, there are two kinds of capsomers called pentamers, which occupy the 12 corner positions of the icosahedral shell, and hexamers, which occupy the face and edges. The number of hexamers varies between different viruses. The capsomers of helical viruses are composed of a single polypeptide and are also called protomers. All viruses of animals, except for poxviruses which have a complex structure, are minimally composed of a nucleocapsid which is the capsid surrounding the nucleic acid. In addition some viruses have an envelope surrounding the nucleocapsid.

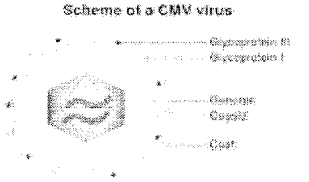
WordNet: capsid
Note: click on a word meaning below to see its connections and related words.

The *noun* has 2 meanings:

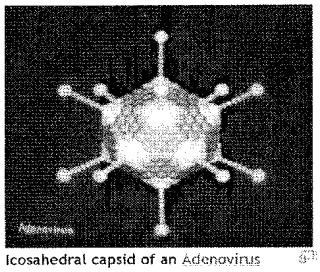
Meaning #1: a variety of leaf bug
Synonyms: mirid bug, mirid

Meaning #2: the outer covering of protein surrounding the nucleic acid of a virus

Wikipedia: capsid



Schematic of a Cytomegalovirus



Icosahedral capsid of an Adenovirus

For the leaf bug, see Miridae.

A **capsid** is the protein shell of a virus. It consists of several oligomeric subunits made of protein. The capsid encloses the genetic material of the virus.

Capsids are broadly classified according to their structure. The majority of viruses have capsids with either helical or icosahedral structure. Some viruses, such as bacteriophages, have developed more complicated structures. The icosahedral shape, which has 20 equilateral triangular faces, approximates a sphere, while the helical shape is cylindrical.[1] The capsid faces may consist of one or more proteins. For example, the foot-and-mouth disease virus capsid has faces consisting of three proteins named VP1-3.[2]

Some viruses are *enveloped*, meaning that the capsid is coated with a lipid membrane known as the *viral envelope*. The envelope is acquired by the capsid from an intracellular membrane; some examples would include the inner nuclear membrane, the golgi membrane, or the cell's outer membrane.[3]

Once the virus has infected the cell, it will start replicating itself, using the mechanisms of the infected host cell. During this process, new capsid subunits are synthesized according to the genetic material of the virus, using the protein biosynthesis mechanism of the cell. During the assembly process, a *portal* subunit is assembled at one vertex of the capsid. Through this portal, viral DNA or RNA is transported into the capsid.[4] The structure and assembly of the Herpes virus Capsid Portal Protein has been imaged via cryo-electron microscopy.[5]

Structural analyses of major capsid protein (MCP) architectures have been used to categorise viruses into families. For example, the bacteriophage PRD1, Paramecium bursaria Chlorella algal virus, and mammalian adenovirus have been placed in the same family.[6]

Notes

1. ^ Branden, Carl and Tooze, John (1991). *Introduction to Protein Structure*, 161-162. ISBN 0-8153-0270-3.
2. ^ Virus Structure (web-books.com).
3. ^ Alberts, Bruce; Bray, Dennis; Lewis, Julian; Raff, Martin; Roberts, Keith; Watson, James D. (1994). *Molecular Biology of the Cell*, 4, 280.
4. ^ Newcomb WW, Homa FL, Brown JC (2005 Aug). "Involvement of the portal at an early step in herpes simplex virus capsid assembly". *Journal of Virology* 79 (16). PMID 16051846.
5. ^ Cardone G, Winkler DC, Trus BL, Cheng N, Heuser JE, Newcomb WW, Brown JC, Steven AC (2007 May 10). "Visualization of the herpes simplex virus portal in situ by cryo-electron tomography". *Virology* 361 (2). PMID 17188319.
6. ^ Khayat et al. classified Sulfolobus turreted icosahedral virus (STIV) and Laurinmäki et al. classified bacteriophage Bam35 - Proc. Natl. Acad. Sci. U.S.A. 103, 3669 (2006); 102, 18944 (2005); Structure 13, 1819 (2005)